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Summary

Consultants' Reports

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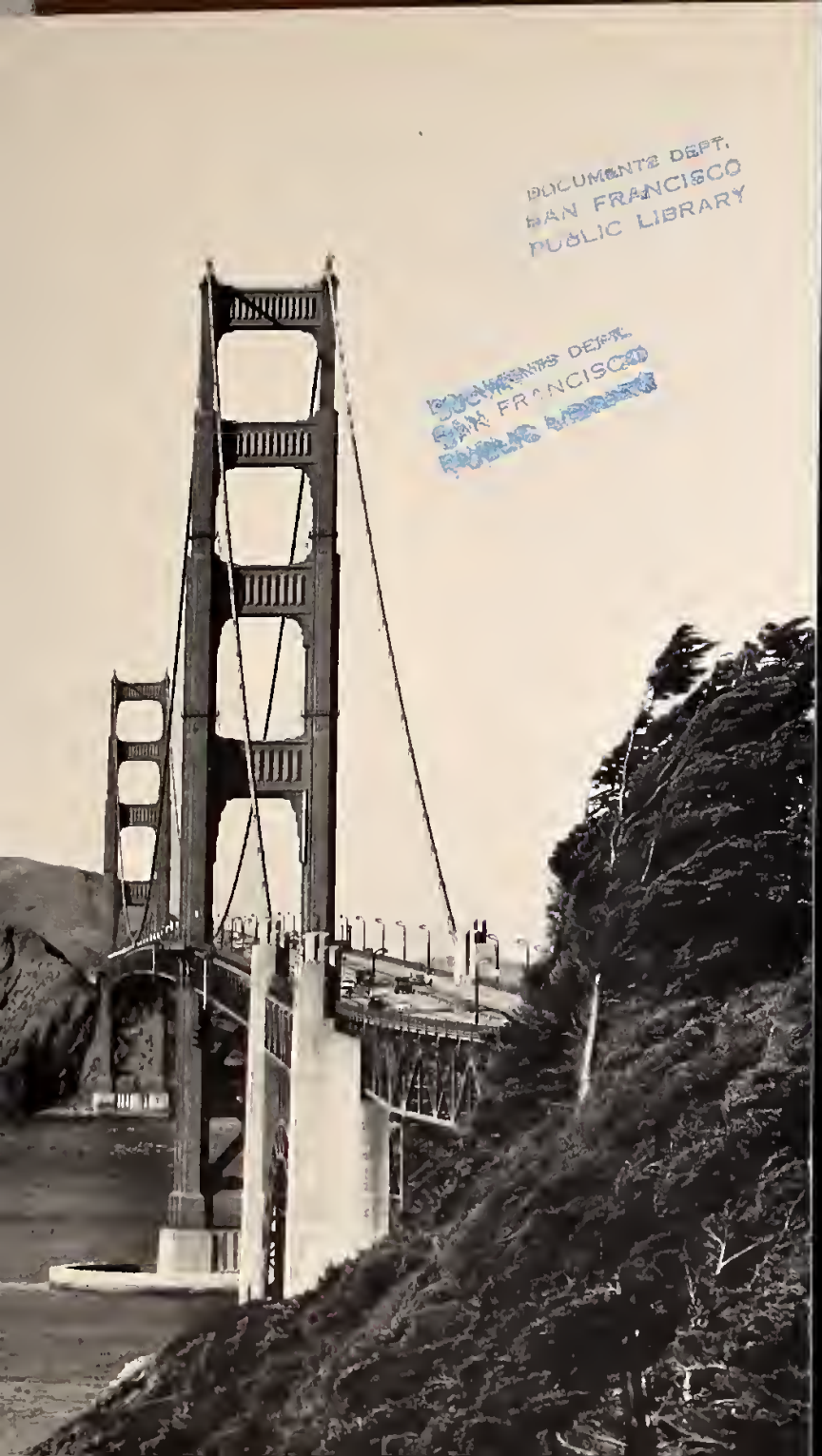
Concepts and Alternatives for
Transportation Facilities Plan

Golden Gate Bridge, Highway and Transportation District



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The Golden

Gate Corridor

The Golden Gate Bridge: Artery of livelihood, recreation, commerce and communication between San Francisco and the counties north of San Francisco Bay.

The Golden Gate Bridge is more than a bridge, too, and more than an "artery." It is the cortex, really, of a whole transportation frame—the Golden Gate Corridor.

It is world-famous, unique, indispensable.

And, by 1970, just about as crowded as it can get.

This crowding, this congestion, this impediment to the future impels the Transportation Facilities Plan of the Golden Gate Bridge Highway and Transportation District.

Del Norte
Mendocino
Sonoma
Napa
Marin
San Francisco
SAN FRANCISCO
OAKLAND
CASCADE RANGE
SACRAMENTO VALLEY
Pt St George
Eureka
Cape Mendocino
Pt Arena
Pt Reyes
Martinez
Fairfield
Alcatraz Island

2

It is a plan not yet shaped but taking shape, with its evolving form to depend on further study and the expressions of the citizens and communities the District serves.

This brief report is a summary of preliminary studies made by the District's engineering and socio-environmental consultants. It is made available at this time so you can review their concepts and offer suggestions that can be used in their final reports and recommendations.

When completed in 1971, the long-range Transportation Facilities Plan will be submitted to the California State Legislature, under whose mandate these studies were done.

To understand better why a long-range plan is important, let's go back a few years:

Serious concepts for the Golden Gate Bridge first came to fruition in 1929. After years of planning and debate—and inaction by existing state and federal levels of government—the voters in the counties of Del Norte, Mendocino, Sonoma, Napa, Marin, and San Francisco elected to join together to develop a bridge across the entrance to San Francisco Bay.

The Golden Gate Bridge and Highway District was thus created to build, operate, and maintain the bridge—a responsibility it has met successfully and solvently for 41 years.

Work to span the Golden Gate Strait began in 1933, and with great civic enthusiasm the crossing was opened to traffic in 1937.

In the Bridge's first full year, 1938, about 3½ million vehicles moved across it.
Since then the traffic has grown.

And grown.

And grown.

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From a traffic average of about 9,000 vehicles a day in 1938, the daily average had reached about 90,000 vehicles by 1969—or close to 32 million a year—with immense traffic pressures during peak hours.

Present traffic volume is near to filling the design capacity of the Bridge, its approaches, and several highway sections in the Golden Gate Corridor. If it's not relieved, what will that volume be like in 1975? In 1985? What would the staggering burden be by the next century?

These are the questions the Legislature, the District's Directors and Management, and the citizens of the District's counties must answer if the Golden Gate Corridor is to avoid an automobile strangehold.

So now the District, its consultants, citizen and government advisory groups are looking ahead, planning ahead. Their concepts are focused on the next few years but concerned as well with the next four decades and the transitions necessary to short and long-range implementation.

The District has already made or planned many improvements to meet the incessant problems.

In the 1960s, the Directors instituted reverse lanes, a one-way toll system, and reduction of bus tolls. In 1968 they ordered a study to determine if the District could successfully operate its own bus transit system. The study, completed by the end of the year, encouraged the District to proceed.

In 1969 the District began detailed studies to establish a bus transit system and, in addition, to restore ferry service between San Francisco and Marin. Early in 1970 the District temporarily took over operation of a private ferry service between Tiburon and San Francisco, and in August, 1970, began its own ferry service between Sausalito and San Francisco. And plans were made to extend ferry service to Central and Northern Marin.

In October, 1970, Directors voted to proceed with an "optimum bus system" between Santa Rosa and San Francisco and with a long-range ferry transportation plan.

But it is obvious that population and traffic growth will outpace even the most imaginative part-way measures.

San Francisco

To "study, construct, acquire, improve, maintain, and operate any and all modes of transportation within the District . . ." That was the District's mandate from the State Legislature in 1969.

Most important in the legislation was the requirement that the District prepare and submit a long-range "transportation facilities plan."

The District retained two prime consultants: Kaiser Engineers, to study the engineering and economic aspects; and Okamoto/Liskamm, Inc., to analyze socio-environmental and urban planning factors. In order to relate the studies closely to the desires and needs of the communities concerned, two advisory groups were formed: the Citizens Advisory Panel (CAP), made up of interested private citizens; and the Technical Advisory Group, composed of representatives of local government agencies in the region under study.

Working with the District staff and advisory groups, and drawing on many earlier studies, the consultants initially compiled and examined some 25 preliminary concepts for mass transportation in the Golden Gate Corridor. At the same time, they developed a comprehensive group of criteria by which to evaluate the concepts. These criteria included 15 major engineering and financial standards and 19 major urban design guideposts. Each of the 25 original concepts was then evaluated, and those which scored low on the criteria scale were eliminated.

The careful evaluation reduced the number of concepts from 25 to five, plus a "test concept,"– that of applying short-term plans to a long-range period. Subsequently, the five concepts were studied in the form of detailed "alternatives," while the "short-term plan" concept was examined for its effect on the region and as a measurement of the long-range alternatives.

Alternatives

The alternatives to which the studies have been narrowed are summarized in the pages that follow.

Since the studies themselves are massive in size, these summaries necessarily cover only the representative highlights. They should, however, be sufficient to give a good general idea of each alternative, to generate further inquiry, and to stimulate suggestions and questions.

They will be discussed in detail at public hearings held throughout the District's counties during December, 1970, and January and February, 1971. Following public discussion and additional study, the District Directors will present a recommendation to the State Legislature, centering upon a single plan, which could be one of the alternatives developed here, or a combination of elements in them.

The descriptions of Alternatives 1 through 5 which follow need a little introductory explanation of some of the terms used:

1. *The estimated annual cost* is the yearly repayment of bond principal and interest *less* yearly operating surplus (or *plus* yearly operating deficit). The figures assume federal funding of two-thirds of the initial investment costs.

2. *Estimated annual cost per passenger* is (1) divided by the number of passengers forecasted for a weekday.

3. *Benefit-Cost Ratio* is the relationship of total economic benefits of capital improvements to total capital costs, as expressed in the equation:

$$\frac{\text{Total Benefits}}{\text{Total Capital Costs}} = \text{Benefit-Cost Ratio}$$

4. The year 2015 was selected as the far-range projection year because it is 40 years from 1975, practically the earliest year in which bonds could be sold to begin implementation. In turn, 40 years is the normal bond repayment period for projects like these.

For easier identification, the alternatives have been color-coded, as follows: 1 Orange, 2 Blue, 3 Red, 4 Green, 5 Purple.

Alternative 1

System

Type of System: Fixed guideway transit on exclusive right-of-way.

Route: From southern terminal in San Francisco central business district at Post-Market Streets, route goes by subway along Geary-Post Corridor west to Park Presidio, then north under Presidio to emerge for lower-deck crossing of Golden Gate Bridge. At north end of bridge, it goes underground again, emerging at Marinship in Sausalito. From this point, north to terminal station in Novato, line generally follows Northwestern Pacific right-of-way on and above surface and through tunnels.

Connections: Feeder buses from Marin stations, connecting to Marin and Sonoma communities and direct link to Richmond BART station. MUNI and BART in San Francisco. Station parking facilities in Marin.

Typical time and fare: SF terminal to San Rafael (including connecting bus): 35 minutes, $1.20 one way (without discount for monthly or weekly commute).

Estimated Annual Cost: $31.2 million in 1980, reducing progressively to a surplus of $1.7 million by 2015.

Estimated annual cost per passenger: $269 in 1985 to income of $9 in 2015.

Benefit-Cost Ratio: 1.05.

Supporting Highway System: Minimum highway system (Highway Network "A"), with no additional motor vehicle lanes added to Golden Gate Bridge.

Weekday Daily Patronage: 196,000 by 1985, 300,700 by 2015.

Peak period passengers: 24,200 by 1985, 29,000 by 2015.

Impact

San Francisco: Direct connection to regional systems. Supports San Francisco growth as regional commercial and retail center. Extends commercial growth out Geary-Post Corridor. Reinforces citywide visual structure, Western Addition redevelopment. Encourages high-rise development at Presidio and Masonic stations. Opportunity to integrate three station areas with downtown pedestrian malls. Limits both variety of activities and occupational base. Possible disruption of residents and property in Geary-Post Corridor.

Southern Marin: Rapid transit station just north of Bridge would provide transfer access to Southern Marin recreation areas. Station areas likely to have medium to high densities. Fixed guideway system needs bus feeder service to/from stations

for door-to-door service. Alignment bypasses present commercial centers, serves those proposed at Alto Center and Marin City. Pressure for development of open space at Bay edge.

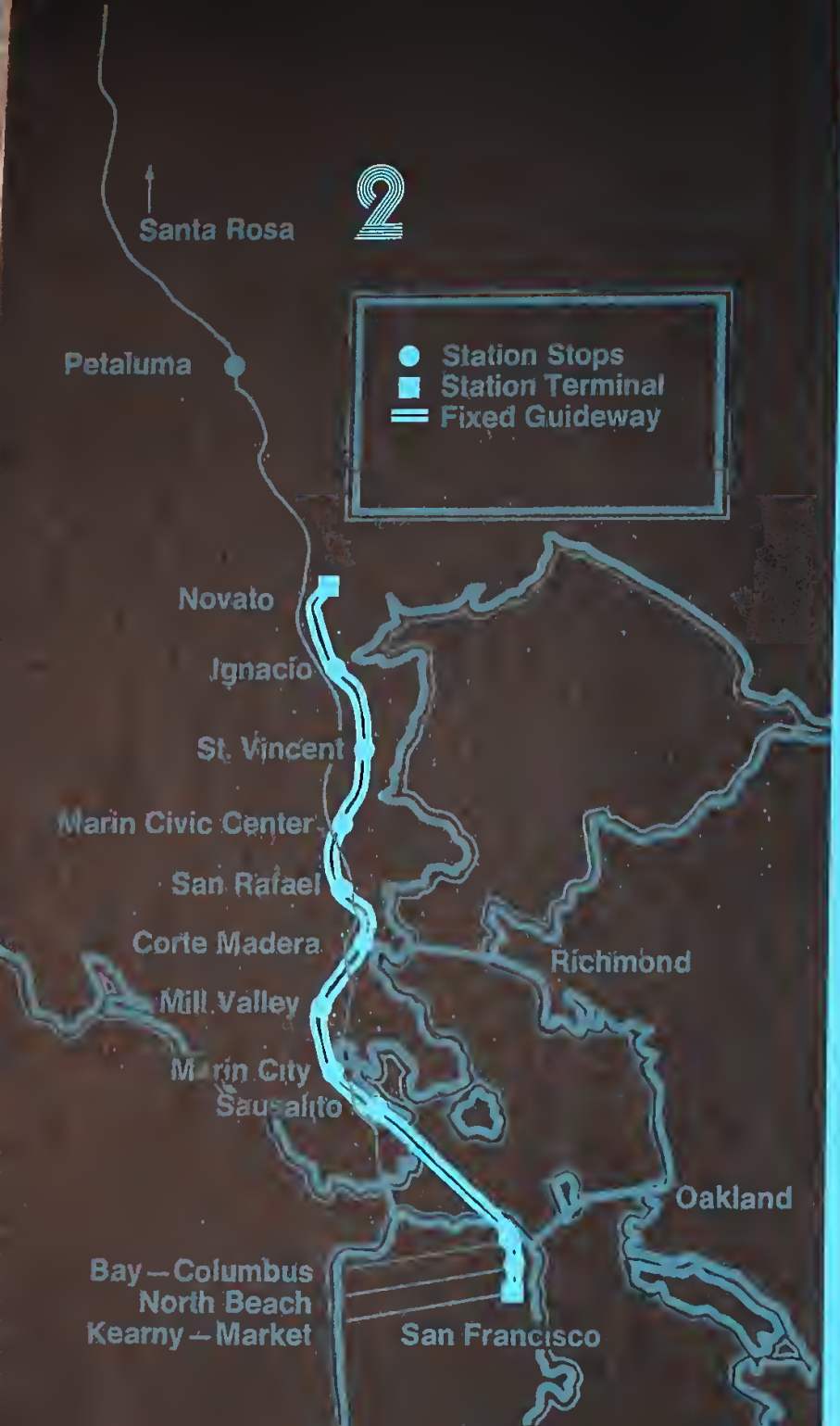
Central Marin: Served to east and to west by feeder system only. Stations at Corte Madera Creek and San Rafael are east of area's patronage center. Transit station could be direct connection to Corte Madera Creek ferry station; high development potential here. Growth of population and commerce apt to bring growth of distribution and storage industries along Bay shore. San Rafael only existing center with direct transit service; its nearby industrial areas would be served; also its central commercial area, though some commercial property would be displaced. San Rafael and Northgate are reinforced as commercial centers. Good relationship to planned industrial/commercial growth.

Northern Marin: Dispersed growth pattern causes more dependence on private vehicles. Opportunities for transit-induced growth due to size and location of developable lands. Poor connection to Gallinas Creek ferry terminal; secondary system needed. Poor connection to existing San Francisco and Oakland airports. Major development potential for St. Vincent and Ignacio station areas. Marshland areas need protection as open space. Transit service to Novato, Petaluma, Santa Rosa downtowns reinforces economic values, creates chance for new growth. Transit-induced growth would improve financing base to pay for transit improvements.

Sonoma County: Potential to generate new economic values in existing commercial and residential centers. Connecting with rest of region reinforces residential potential and can attract labor-sensitive industry. Opportunity for feeder systems from East Bay to connect with fixed guideway terminals in Marin, thence to San Francisco or Sonoma. Fixed trunk line extension will concentrate growth, preserve open space. Puts recreation areas within reach of larger numbers of Bay Area residents.

East Bay: BART/Richmond served by bus feeder to/from San Rafael. Bus feeder, however, provides minimal linking with old commercial areas of Richmond. Link with Marin provides labor supply, job opportunities with development of industry in Marin and Sonoma. Link also opens choices for housing. Bus services to north counties create new recreational opportunity.

Other Concerns: System could be ultimate solution after transition from bus systems. "optimum bus plan" and exclusive busways. High benefit to San Francisco's intra-county service needs. Because it supports commercial growth in San Francisco, Alternative 1 could be at variance with CAP and ABAG goals of encouraging other job centers. But it conforms to CAP goal of service to low-income communities. Growth in north counties may conflict with CAP goal to save open space near urban areas.



Alternative 2

System

Type of System: Fixed guideway transit on exclusive right-of-way.

Route: From southern terminal at Kearny-Market Streets in San Francisco, line runs north and west in subway along Kearny and Columbus to Aquatic Park. There it enters a subaqueous tube extending under Bay to Sausalito Point. From here the line proceeds north, first in subway, then at grade on the Northwestern Pacific right-of-way to Marinship/Sausalito area where it joins the Alternative 1 alignment going north to the Novato terminal.

Connections: Feeder buses from Marin stations, connecting to Marin and Sonoma communities and direct link to Richmond BART station. MUNI and BART in San Francisco. Parking facilities at Marin stations.

Typical time and fare: SF terminal to San Rafael (including connecting bus): 25 minutes, $1.20 one way (without discount for monthly or weekly commute).

Estimated Annual Cost: Varies according to supporting highway system: (A) $31.2 million in 1980, reducing progressively to surplus of $2.6 million by 2015; (B) $30.6 million in 1980, reducing to $0.5 million by 2015.

Estimated annual cost per passenger: (A) $389 in 1985, to income of $23 by 2015; (B) $425 in 1985 to $7 in 2015.

Benefit-Cost Ratio: Varies according to supporting highway system: (A) 1.12, (B) 0.88.

Supporting Highway Systems: Choice of minimum highway system (Highway Network "A") with no motor vehicle lanes added to Bridge; and *moderate* highway system (Highway Network "B") with four lanes added to Bridge and some freeway expansion.

Weekday Daily Patronage: (A) 135,800 by 1985, 229,400 by 2015; (B) 123,900 by 1985, 209,400 by 2015.

Peak period passengers: (A) 23,400 by 1985, 35,400 by 2015; (B) 20,000 by 1985, 33,000 by 2015.

Impact

San Francisco: *Common elements of each of the two highway network options:* Direct connections with local and regional systems from north counties. Disruption of residents and property in North Beach-Chinatown corridor. Support of San Francisco's growth as regional commercial and retail center. Systems limit variety of activities, narrow occupational base. Possible disruption of historic wharfside block. Broadway station is focal point for North Beach area, connecting to pedestrian malls. Northerly expansion of Central Business District is reinforced. Disruption to small-scale enterprise in North Beach-Chinatown commercial areas. *Differing elements:* Highway Network A implies development at Columbus Corridor station, causing extension of Central Business District, disruption to neighborhood

centers. Highway Network B requires increased auto circulation and parking in commercial areas.

Southern Marin: *Common elements of each of the two highway network options:* Fixed guideway systems require bus feeder service to stations for door-to-door service. Feeder service to stations conflicts with local traffic in Sausalito. Medium to high densities encouraged in station areas. Service provided to proposed shopping centers at Alto Center and Marin City. Pressure to develop open space, including Bay's edge in Southern Marin. Uses of recreational open space would be concentrated closer to urban areas. Downtown Sausalito businesses east of Bridgeway vulnerable to disruption. *Differing elements:* Highway Network A causes alignment to by-pass existing commercial centers in Sausalito. Highway Network B results in better relation to existing commercial centers in Sausalito, improves access. Highway Network B also improves auto access throughout Southern Marin, bringing likelihood of a more dispersed growth than with Network A and more widespread use of open space.

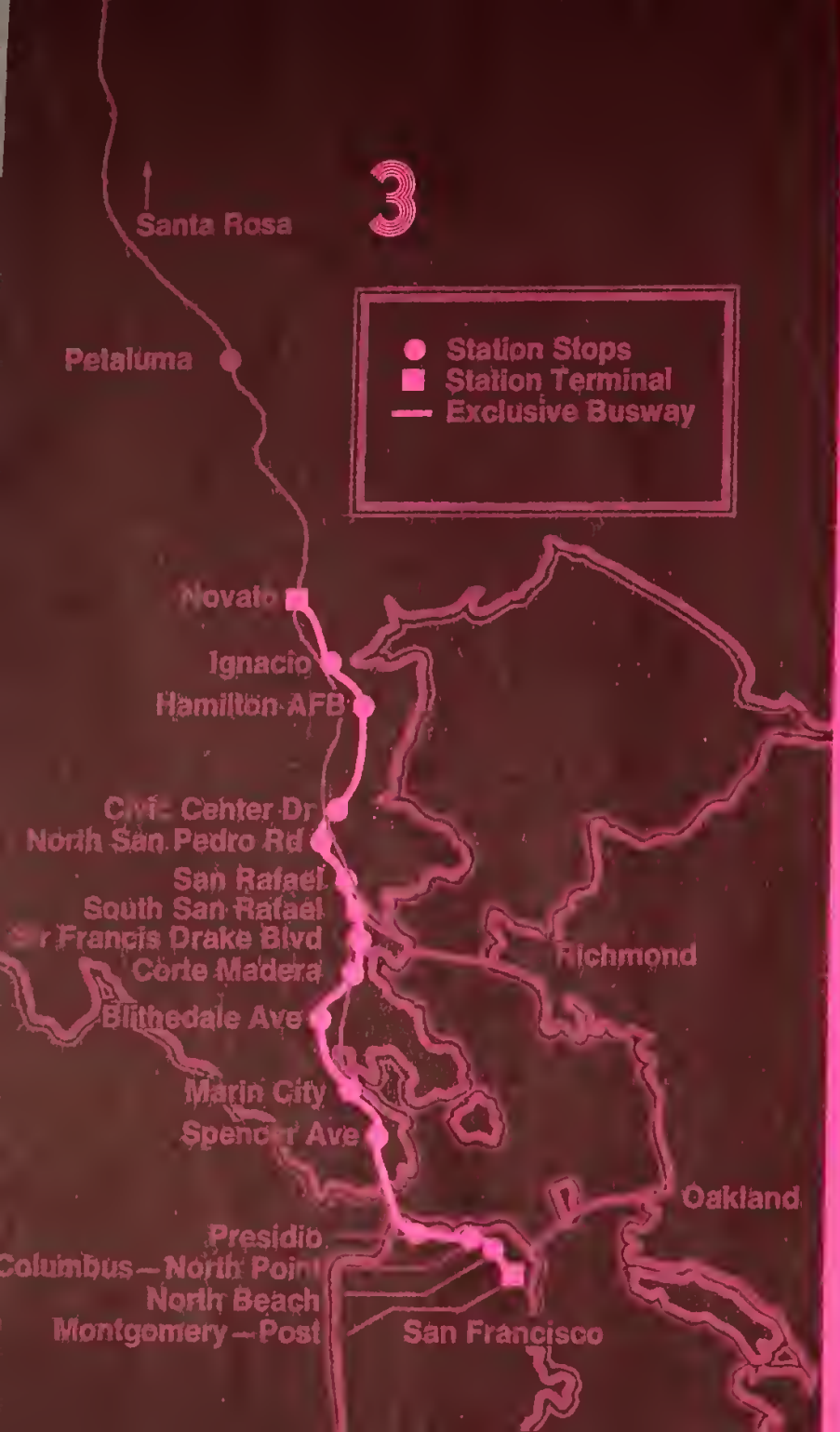
Central Marin: *Common elements of each of the two highway network options:* Public service to stations and to East Bay limited to feeder systems; two stations located east of patronage centers. Transit station south of Corte Madera Creek could be directly connected to proposed ferry terminal, if terminal's Bayfront site is environmentally acceptable; development potential is high at this site. "Natural environments" of creek and Marin Civic Center vulnerable. Of all existing community centers, San Rafael would be only one with direct rapid transit service; San Rafael industrial areas and central commercial districts would be served, but service would displace some commercial property, reinforce other commercial centers such as Northgate. Much higher density in station areas than exists now; cluster development likely at Corte Madera Creek, San Rafael, and Marin Civic Center/Northgate stations. *Differing elements:* Highway Network A would reduce number of autos, roadways and parking areas in Marin Civic Center area; Highway Network B assumes increased facilities for autos, including some use of second deck on bridge. Network A provides sound relationship to planned industrial/commercial growth; B produces service to planned Corte Madera industrial/commercial property east of U.S. 101. B also improves access to ferry terminal, due to Highway 17 improvement.

Northern Marin: No significant differences in impacts of highway network options. Difficulties of serving dispersed growth pattern cause greater reliance on private vehicles for connections to trunk line. Opportunities for transit-induced growth to stimulate establishment of activity centers. Poor connections to existing regional airports and to Gallinas Creek ferry terminal; secondary connection system required. Major development potential for St. Vincent School and Ignacio station areas if encroachment on marshlands is avoided. Large parcels facilitate comprehensive planning. Transit service to existing downtowns reinforces economic values and creates opportunities for new growth, improving financial base to pay for transit improvements.

Sonoma County: No significant differences in impacts of highway network options. Potential to generate new economic values in existing commercial and residential centers. As with Alternatives 1-3, #2 creates opportunity for high capacity transit link to future regional airport. System reinforces residential potential, could attract industry sensitive to labor supply. Opportunity for feeder systems from East Bay to connect with fixed guideway terminals in Marin, thus completing service to Sonoma and San Francisco. System would serve existing centers, open recreation areas in Sonoma to increased use by Bay Area residents. Fixed trunk line extension will concentrate growth, preserve open space from sprawling encroachment.

East Bay: No significant differences in impacts of highway network options: BART/Richmond served by direct bus link to/from San Rafael. Bus feeder service between Richmond and San Rafael provides connection with Marin, opening East Bay labor markets to Marin-Sonoma industry and commerce, creating housing choices for non-drivers. Increases recreational opportunities for East Bay residents.

Other Concerns: *Common elements with each of the two highway network options:* Alternative 2 supports commercial growth in San Francisco, conflicting with Citizens Advisory Panel (CAP) and ABAG goals of stimulating other job centers. Poor service to low income communities. Growth in northern counties at variance with CAP goal of saving open space near urban areas. *Unique elements:* With Highway Network A, Alternative 2 has potential of producing the greatest transit patronage and revenues. With Highway Network B, increased auto capacity in Golden Gate Corridor and on bridge will increase toll revenues and help finance capital costs of transit system.



Alternative 3

System

Type of System: Bus rapid transit on exclusive right-of-way.

Route: Montgomery-Post Street is the location of the terminal in San Francisco. The line runs north and west in a bus subway under Kearny and Columbus, then west under Beach Street, Fort Mason and Marina Boulevard to the Presidio, where it surfaces. In the Presidio, line generally follows Golden Gate Bridge approach on an aerial structure and tunnel to a lower deck on Bridge. At north end of Bridge, busway emerges, goes north on aerial structure between north and southbound lanes of Highway 101 and through a third Waldo tunnel. At foot of Waldo Grade, busway leaves highway median, runs north on west side of 101 to point north of Highway 1 interchange, where it joins Northwestern Pacific right-of-way. From this point north to Novato, busway generally follows NWP right-of-way on grade, except where topography requires aerial structures or tunnels.

Connections: Direct bus services (right from busway) to Marin and Sonoma communities and BART/Richmond; or feeder buses from transfer points. In San Francisco, MUNI and BART. Parking facilities at Marin stations.

Typical time and fare: SF terminal to San Rafael (including connecting bus): 29 minutes, $1.20 one way (without discount for monthly or weekly commute).

Estimated Annual Cost: $17.1 million in 1980, reducing progressively to $1 million by 2015.

Estimated annual cost per passenger: $235 in 1985, to $10 in 2015.

Benefit-Cost Ratio: 1.42.

Supporting Highway System: Minimum highway system (Highway Network "A"), with no additional motor vehicle lanes added to Bridge except exclusive busway.

Weekday Daily Patronage: 130,200 by 1985, 208,900 by 2015.

Peak period passengers: 17,400 by 1985, 27,800 by 2015.

Impact

San Francisco: Direct connection with local and regional systems from north counties. Supports growth of San Francisco as regional commercial and retail center. Marin and Sonoma housing resources for San Francisco workers. Commercial growth in San Francisco limits variety of activities, narrows occupational base. Encourages northerly expansion of central business district. Broadway Station focal point for North Beach areas, connecting to pedestrian malls. Generally low potential for displacement of residents and property, but would disrupt neighborhood businesses in North Beach-Chinatown because of downtown expansion.

Southern Marin: Collector trunk line buses circulating through neighborhoods would provide best door-to-door feeder service. Proposed shopping centers well served. Current development patterns reinforced, with new pressure for development of present open space. Possible use of Bridge busways by autos on weekends intensifies use of open space areas. Use of recreation/open space concentrated closer to urban areas. Poor ferry connection. Alignment bypasses existing commercial centers. Disruption to Sausalito businesses east of Bridgeway could result.

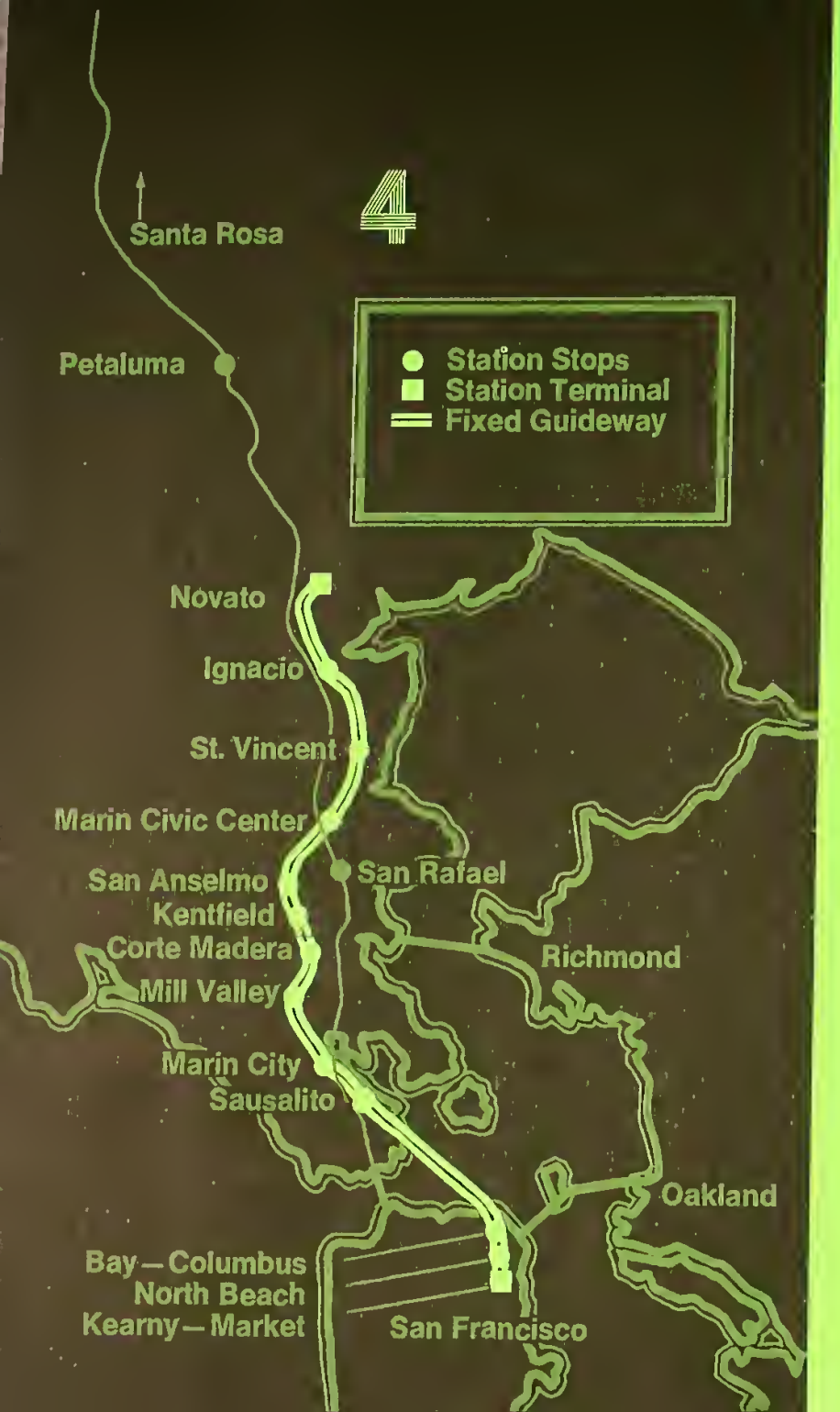
Central Marin: Good potential for transit to tie in with ferry terminals on both sides of Corte Madera Creek. Intra-county movement east/west is served. High land values, intense residential use would be spurred at Corte Madera station. "Natural environments" of Corte Madera Creek and Marin Civic Center would be encroached upon, but auto facilities at Civic Center would be stemmed. San Rafael would be only existing community center served by transit. San Rafael industrial and central commercial areas served. Commercial centers in San Rafael and Northgate are reinforced. Commercial property in San Rafael is displaced.

Northern Marin: Busway concept permits new growth to be determined by non-transit factors; growth slower than with fixed guideways. Transit-induced growth will improve financing base for transit improvements, however. Connections to San Francisco and Oakland airports poor. One of the lowest potentials for concentrated development close to marshland; large parcels make comprehensive planning possible. Buses could leave trunk line to serve Gallinas Creek ferry terminal. No station in downtown Novato as with fixed guideway alternatives.

Sonoma County: Potential to generate new economic values in existing commercial and residential centers. Reinforcement of residential potential, attraction of industry in need of labor supply. Feeder systems from East Bay could be phased in with transition to fixed guideway. Future trunk line transit extensions can concentrate growth, preserve open space. Extension of direct service will connect existing centers in Sonoma with those in Marin and San Francisco. Recreation areas more accessible to Bay Area residents.

East Bay: Improved linking of Richmond through feeder connection to busway system in Marin and Sonoma. Minimal linking of old commercial areas. Linking of East Bay with north counties provides East Bay labor supply for industrial development in Marin and Sonoma. New choices in housing opened to East Bay workers.

Other Concerns: Total system costs are lowered; and system can be phased to a fixed guideway system. Lowest capital costs of all alternatives. Supports commercial growth in San Francisco, contrary to CAP and ABAG goals. Poor service to low income communities. Best alternative for preserving open space near urban areas and in station vicinities. Possibility of noise and air pollution if conventional buses are used.



Alternative 4

System

Type of System: Fixed guideway transit on exclusive right-of-way.

Route: This alignment is just like Alternative 2 from San Francisco to Mill Valley—that is, from Kearny-Market Streets under Kearny and Columbus to Aquatic Park, then by underwater tube across bay to Sausalito Point, where it emerges and heads north on the Northwestern Pacific right-of-way. Between Mill Valley and Marin Civic Center, the line swings west generally along the *old* railroad right-of-way through Corte Madera, Larkspur, Kentfield, and Ross to San Anselmo. Between Corte Madera and San Anselmo, most of line is elevated to avoid obstructing streets. North of San Anselmo, the line enters a long tunnel going northeast to a portal west of Highway 101. Then it goes on the surface beneath the elevated 101 to pick up the alignment at Marin County Fairgrounds (as in Alternatives 1 and 2) just north of Marin Civic Center. From that point it generally follows the Northwestern Pacific right-of-way to the Novato terminal.

Connections: Feeder buses from Marin stations, connecting to Marin and Sonoma communities and Richmond BART station. MUNI and BART in San Francisco. Parking facilities at Marin stations.

Typical time and fare: SF terminal to San Rafael (including connecting bus); 26 minutes, $1.20 one way (without discount for monthly or weekly commute).

Estimated Annual Cost: $31.5 million in 1980, reducing progressively to $0.3 million by 2015.

Estimated annual cost per passenger: $441 in 1985, to $5 in 2015.

Benefit-Cost Ratio: 0.86.

Supporting Highway System: Moderate highway system (Highway Network "B") with four motor vehicle lanes added to Bridge and some freeway expansion.

Weekday Daily Patronage: 123,200 by 1985; 208,500 by 2015.

Peak period passengers: 21,600 by 1985, 35,200 by 2015.

Impact

San Francisco: Direct connection with local and regional systems from north counties. Supports growth of San Francisco as regional commercial and retail center. Marin and Sonoma housing resources for San Francisco workers. Commercial growth in San Francisco limits variety of activities, narrows occupational base. Potential disruption in historic wharfside block. Broadway station would be focal point for North Beach area, connecting to pedestrian malls. Central business district would tend to expand northward. Central business district emerges as regional center, with connection of north waterfront and downtown. Higher demand for auto circulation and parking in commercial areas. Possible disruption of residents, property, and small-scale business in North Beach-Chinatown areas.

Southern Marin: Fixed guideway system requires feeder service to stations for door-to-door service. Medium to high densities likely in station areas. System serves proposed shopping centers at Alto Center and Marin City. Transit improvements create pressure for development of open space, though development at Bay's edge is avoided. Use of recreational open space is concentrated closer to urban areas. Alignment passes through existing commercial centers in Sausalito; station located north of commercial district. Disruption of downtown businesses east of Bridgeway in Sausalito could result.

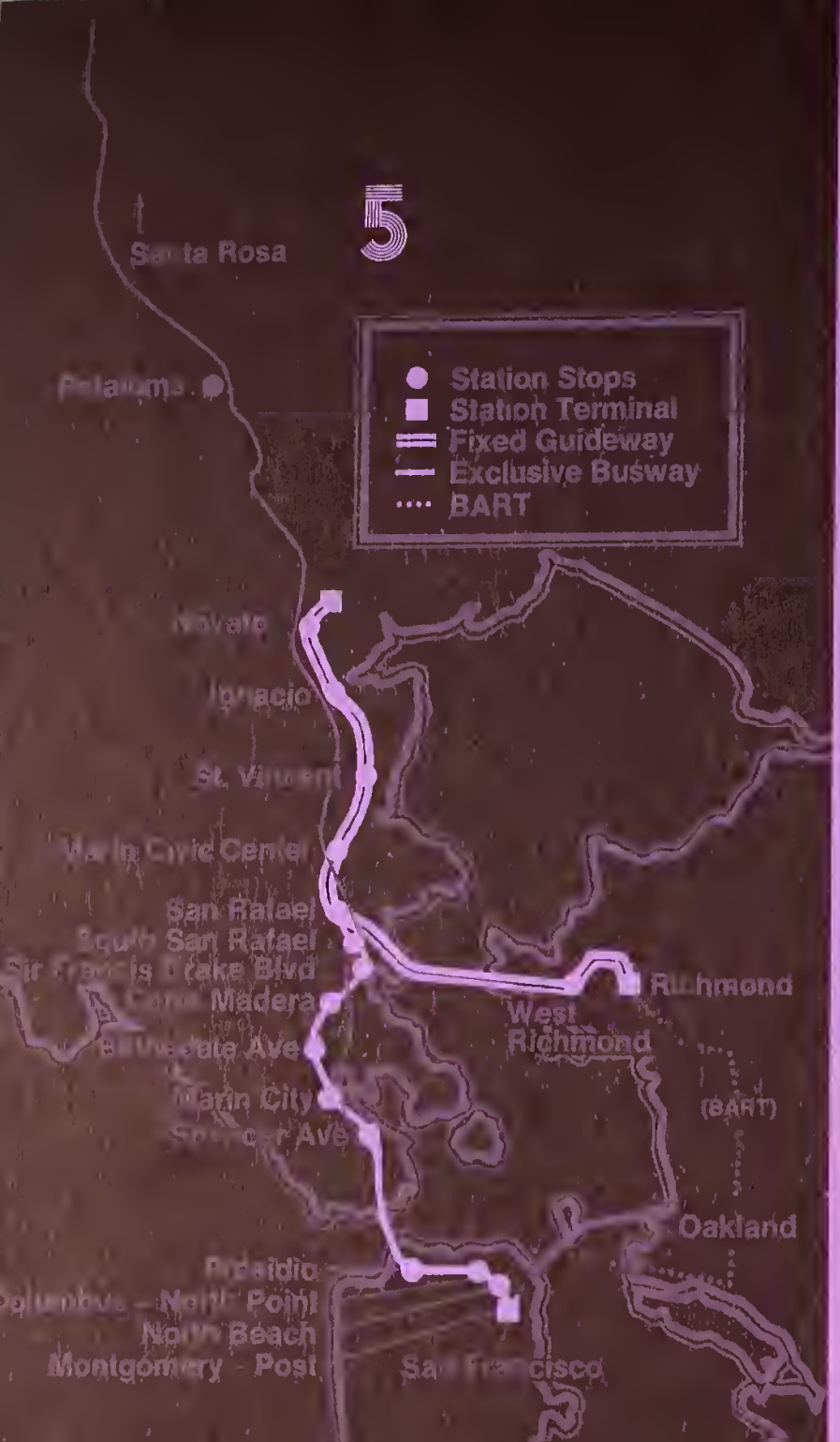
Central Marin: Stations at Corte Madera town center, Kentfield, and San Anselmo are near center of transit-user area. Assumption of advanced highway network implies increased facilities on bridge for autos, despite diversion of local and through traffic to transit. No direct connection to Central Marin ferry terminals. Bus feeder system and more parking facilities needed to serve ferry terminals. Development pressure at Bay's edge is avoided. Except for San Rafael, existing community centers are directly served. San Rafael industrial areas likewise by-passed. Commercial centers served at Corte Madera, Larkspur, Kentfield, San Anselmo, Terra Linda, with resulting pressures for higher densities in residential and station areas.

Northern Marin: Dispersed growth pattern causes reliance on more private vehicles for connections to trunk line. Opportunities for transit-induced growth to stimulate establishment of activity centers. Poor connections to existing regional airports and to Gallinas Creek ferry terminal; secondary connection system required. Major development potential for St. Vincent School and Ignacio station areas if encroachment on marshlands is avoided. Large parcels facilitate comprehensive planning. Transit service to existing downtown reinforces economic values and creates opportunities for new growth, improving financial base to pay for transit improvements.

Sonoma County: Potential to generate new economic values in existing commercial and residential centers. As with Alternatives 1-3, #4 creates opportunity for high capacity transit link to future regional airport. System reinforces residential potential, could attract industry sensitive to labor supply. Opportunity for feeder systems from East Bay to connect with fixed guideway terminals in Marin, thus completing service to Sonoma and San Francisco. System would serve existing centers, open recreation areas in Sonoma to increased use by Bay Area residents. Fixed trunk line extension will concentrate growth, preserve open space from sprawling encroachment.

East Bay: BART/Richmond served by bus feeder to/from San Anselmo via San Rafael. Bus feeder service between Richmond and San Rafael provides connection with Marin, opening East Bay labor markets to Marin-Sonoma industry and commerce, creating housing choices for non-drivers. Increases recreational opportunities for East Bay residents.

Other Concerns: Disruption of existing residential and commercial areas, especially in Marin. Assumption of greater highway network (with second deck on bridge) increases potential for increased bridge toll revenues to finance capital costs. System supports commercial growth of San Francisco, but provides minimal service to low income communities. Growth in north counties may conflict with CAP goal of saving open space, protecting present environmental quality near urban areas.



Alternative 5

System

Type of System: Exclusive busway from San Rafael to San Francisco and rail line extension of BART from Richmond to San Rafael and north to Novato.

Route: The busway route is identical to the San Francisco-San Rafael segment of Alternative 3—from Kearny-Market to second deck of Bridge, then on to San Rafael. The rail line would extend from the BART terminal in Richmond through the City of Richmond to a new bridge built exclusively for BART trains, parallel to the existing Richmond-San Rafael Bridge. BART train would cross to Point San Quentin, and from there proceed to San Rafael where it would join the alignments of Alternatives 1 and 2 and continue to the Novato terminal.

Connections: In Marin County, feeder buses from fixed guideway stations to Marin and Sonoma communities. Along exclusive busway, direct bus services to central and southern Marin communities. BART connections in East Bay, and BART and MUNI in San Francisco. Parking facilities at trunk line and busway stations in Marin.

Typical time and fare: SF terminal via Golden Gate Bridge to San Rafael (including connecting bus): 29 minutes, $1.20 one way (without discount for monthly or weekly commute); Richmond to Novato, 30 minutes, 95¢ one way.

Estimated Annual Cost: $34.6 million in 1980, decreasing progressively to $0.1 million by 2015.

Estimated annual cost per passenger: $506 in 1985, to $2 in 2015.

Benefit-Cost Ratio: 0.72.

Supporting Highway System: Minimum highway system (Highway Network "A"), with no additional motor vehicle lanes added to Golden Gate Bridge except for exclusive busway.

Weekday Daily Patronage: 119,800 by 1985, 205,100 by 2015.

Peak period passengers: 15,200 by 1985, 20,000 by 2015.

Impact

San Francisco: Direct connection with local and regional systems from north counties. Least displacement of San Francisco housing. Least support of growth of San Francisco as regional commercial and retail center. As in other alternatives, Marin and Sonoma provide housing resources. Little urban design impact on downtown San Francisco; long-range prevention of unneeded increases in San Francisco density. Broadway station focal point for North Beach area, connecting to pedestrian malls. Direct connection by busway between north waterfront and central business district. Like alternatives 2, 3 and 4, disruptive in effects on small-scale enterprise in North Beach-Chinatown sector.

Southern Marin: Door-to-door service possible via trunk line buses circulating through neighborhoods. Low development pressure; fixed guideway focuses development pressure north of San Rafael. Busway-related development south of San Rafael less heavy, but some pressure nevertheless. Open space areas subject to intensive use by motorists; possible auto use of second deck of bridge on weekends. No direct connection between bus stops and ferry terminals. Alignment by-passes existing commercial centers.

Central Marin: Corte Madera Creek, San Rafael, and Marin Civic Center stations and collector buses serve east/west movement. Linking of Marin to East Bay movement. Major increase in demand for auto facilities. Potential transit tie-in with Corte Madera Creek ferry terminals. Bus feeder system and more parking facilities required at ferry terminals. Negative effects on "natural environments" at Corte Madera Creek and Marin Civic Center. High land values, intense residential use encouraged by Corte Madera Creek Station. System serves industrial and commercial areas near San Rafael, connects them with comparable areas in Richmond and Santa Rosa. Other Marin commercial centers not directly served by fixed guideway transit.

Northern Marin: Dispersed growth pattern causes more reliance on private vehicles. Growth in Northern Marin segment would be slower with this alternative than with others. Direct connection, via BART, to Oakland Airport. Secondary system required to provide connection with Gallinas Creek ferry terminal. Lower potential than other alternatives for concentrated development in station areas. Marshland near St. Vincent School station; preservation of open space, nature areas important consideration here. Large parcels facilitate comprehensive planning. Buses can go north of trunk line for neighborhood service.

Sonoma County: Sonoma linked to south by bus feeder to fixed guideway terminal at Novato, then to San Rafael to continue on BART to East Bay or transfer to southbound busway. Direct connection to Oakland Airport via BART route. Potential to generate new economic values in commercial and residential centers. Improved access from East Bay creates regional patterns of housing. Better connection to whole Bay region improves residential potential, makes area more attractive to industry attuned to labor supply. Future trunk line extension into Sonoma County will concentrate growth, preserve sizeable open space. Recreation areas will be opened to greater numbers of Bay Area residents; existing commercial centers are connected to centers in other sectors of Golden Gate Corridor.

East Bay: Direct, continuous link from BART/Richmond to Marin as far north as Novato, with bus transfer and eventual trunk extension to Sonoma. Immediate impact on old commercial areas would be minimal, could change as station area development is generated. Direct linking of East Bay labor market with industrial-commercial development in Marin and Sonoma. Choice of housing locations improved for wide range of residential users, including non-drivers. Direct access to Marin-Sonoma recreation.

Other Concerns: Low patronage revenue potential for financing capital and operating growth. Although it supports commercial growth in San Francisco, Alternative 5 better meets CAP and ABAG goals of encouraging growth of other job centers. Possible noise, air pollution from main busway. Good opportunity to distribute growth, preserve open space near urbanized areas and in vicinity of stations. Opportunity to phase from busway to fixed guideway.

The Test Alternative

Discarded As Long-Range Solution

The 6th Alternative was that of making the District's interim "optimum bus system" and supporting ferry service serve as a long-range solution as well, without any conversion to rapid transit.

The optimum bus system and ferry service together fulfill the District's purpose of creating a significant short-range improvement that can also serve as a compatible transition to, and complement of, rapid transit systems. The optimum bus system and ferry service are designed to be the mass public transit in the Golden Gate Corridor until about 1980. After that, they would be converted to the role of feeders and collectors for fixed guideway or exclusive busway rapid transit vehicles.

Standing by themselves as a long-range solution, however, the optimum bus system and supporting ferry service would not—according to the District's consultants—be able to meet engineering and environmental criteria beyond 1980. The reasons are many, but foremost among them are: the congesting effects on existing San Francisco streets and north county streets, highways and freeways, with resulting public pressure for major expansion of them to accommodate bus and auto traffic; the failure of such an alternative to open new housing or job opportunities; restraints on planned growth due to limited accesses; high demand for parking facilities; constraints on recreational opportunities; encouragement of "sprawl" development of open spaces —a "Los Angelesation" of counties and ill-defined civic centers; poor inter-county linking. In short, an expanding kingdom of the automobile with all that that implies.

Its main advantage is "price"—the direct cost of establishing and operating the system. But ultimately the indirect, yet related costs of restrictions on intelligent growth, housing choice and employment opportunity, haphazard land use, and long-range highway expansion are incalculable.

System Features and Operating Data

Transit Alternative	Length of Trunk Line (Miles)	Number of Stations	Travel Time and One Way Fare Between			
			San Francisco CBD and			Richmond and
			Novato	San Rafael	Mill Valley	Novato
1A	30	18	47 min. 140¢	35 min. 120¢	29 min. 100¢	36 min. 95¢
2A	27	12	37 min. 140¢	25 min. 120¢	19 min. 100¢	36 min. 95¢
2B	27	12	37 min. 140¢	25 min. 120¢	19 min. 100¢	36 min. 95¢
3A	28	16	43 min. 140¢	29 min. 120¢	23 min. 100¢	33 min. 95¢
4B	27	13	38 min. 140¢	26 min. 120¢	19 min. 100¢	43 min. 95¢
5A	41	16	40 min. 140¢	29 min. 120¢	23 min. 100¢	30 min. 95¢

A = Minimum supporting highway network.
B = Moderate supporting highway network, with second deck of bridge and some freeway expansion.

Patronage

Transit Alternative	Peak Period Passengers at Maximum Load Point (One-way)		Total Daily Patronage (Weekday)	
	1985	2015	1985	2015
1A	24,200	29,000	196,000	300,700
2A	23,400	35,400	135,800	229,400
2B	20,000	33,000	123,900	209,400
3A	17,400	27,800	130,200	208,900
4B	21,600	35,200	123,200	208,500
5A	15,200	22,000	119,800	205,100

A = Minimum supporting highway network.
B = Moderate supporting highway network, with second deck of bridge and some freeway expansion.

Costs (Millions of Dollars)

Transit Alternative	Total Capital Requirement 1980	Annual Net Operating Surplus		Cumulative Net Operating Surplus to 2015	Annual Debt Service Charge	
		1980	2015		1980	2015
1A	987	4.8	10.7	242	36	9
2A	932	2.8	12.6	227	34	10
2B	915	2.4	9.5	178	33	10
3A	495	0.9	1.0	34	18	2
4B	944	2.5	9.7	184	34	10
5A	944	—0.6	5.1	65	34	5

A = Minimum supporting highway network.
B = Moderate supporting highway network, with second deck of bridge and some freeway expansion.

Benefit-Cost Analysis

Transit Alternative	Total Benefit (Present Value) (Millions)	Total Capital Cost (Present Value) (Millions)	Benefit-Cost Ratio
1A	$754	$716	1.05
2A	763	679	1.12
2B	589	668	0.88
3A	528	372	1.42
4B	597	696	0.86
5A	497	692	0.72

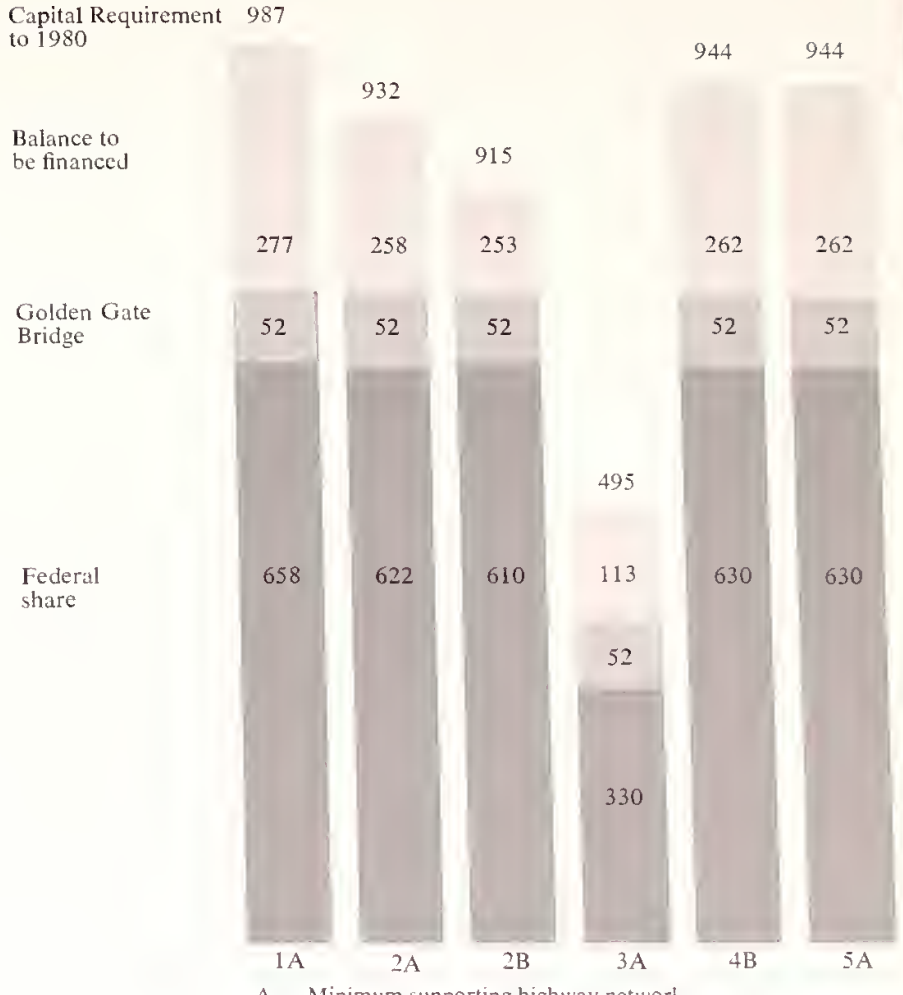
A = Minimum supporting highway network.
B = Moderate supporting highway network, with second deck of bridge and some freeway expansion.

Population and Employment Projections Used as a Basis for the Patronage Forecasts

County	Year	Population	Employed Residents
ALAMEDA	1965	1,085,000	417,000
	1990	1,681,000	696,000
	2015	2,023,000	827,000
CONTRA COSTA	1965	530,000	188,000
	1990	1,080,000	421,000
	2015	1,489,000	578,000
MARIN	1965	182,000	68,000
	1990	404,000	175,000
	2015	586,000	254,000
NAPA	1965	62,000	24,000
	1990	140,000	64,000
	2015	181,000	84,000
SAN FRANCISCO	1965	755,000	333,000
	1990	827,000	394,000
	2015	982,000	475,000
SAN MATEO	1965	560,000	215,000
	1990	872,000	370,000
	2015	966,000	411,000
SANTA CLARA	1965	902,000	321,000
	1990	1,808,000	703,000
	2015	2,323,000	900,000
SOLANO	1965	149,000	52,000
	1990	316,000	127,000
	2015	685,000	275,000
SONOMA	1965	171,000	55,000
	1990	368,000	132,000
	2015	722,000	257,000
TOTAL REGION	1965	4,396,000	1,673,000
	1990	7,496,000	3,081,000
	2015	9,957,000	4,061,000

Source: Bay Area Transportation Study and Bay Area Simulation Study.

Funding Requirements (Millions of Dollars)



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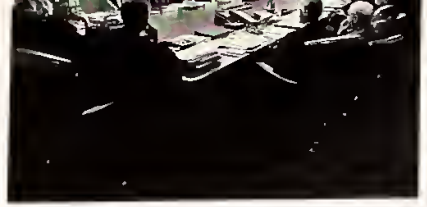

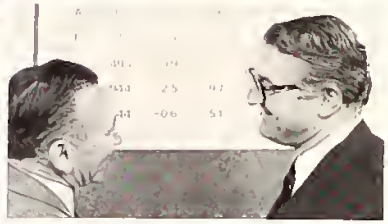

Review by the Public

Selection of a Long-Range Plan

In order to insure the broadest possible dialogue, the District has scheduled 20 public hearings which will begin in December and extend through the first week of February, 1971.

A panel of District Directors will participate in each hearing, and a stenographic record will be made of all comments and suggestions from individuals and representatives of public and civic bodies. Following the public hearings, the Directors, with the aid of the District's Management and consultants, will select one of the Alternative Plans or a variation for submission to the Legislature. This must be done by March 31, 1971.

The Legislature will then consider the District's proposal with a view toward enacting legislation that can make the submitted plan a reality. Before bonds may be issued to help finance the equipment and construction, the public must vote its approval.

The implementation of a long-range Transportation Facilities Plan will, of course, require sound policies and procedures for governing and administering the system.

A study of the intricate factors of governance is being made, and conclusions and recommendations will be made public when the study is completed.

Schedule of Public Hearings

December		
Ukiah	Thursday	December 3, 1970
San Francisco Civic Center	Tuesday	December 8
San Rafael	Thursday	December 10
San Francisco Marina District	Monday	December 14
Santa Rosa	Wednesday	December 16
Mill Valley	Thursday	December 17
January		
Sonoma	Tuesday	January 5, 1971
Novato	Wednesday	January 6
San Anselmo	Thursday	January 7
Corte Madera	Monday	January 11
San Francisco North Beach District	Tuesday	January 12
Napa	Wednesday	January 13
San Francisco Richmond District	Thursday	January 14
San Francisco Geary Expressway	Friday	January 15
Crescent City	Tuesday	January 19
Sausalito	Friday	January 22
Healdsburg	Monday	January 25
Petaluma	Tuesday	January 26
February		
San Francisco Civic Center Final Hearings for All S. F. Interests	Tuesday	February 2
San Rafael Final Hearings for All North County Interests	Wednesday	February 3

Technical Advisory Group

Robert E. Graham
Regional Transportation Planning Committee
Association of Bay Area Governments

Robert W. Sieker
State Division of Highways

Thomas G. Bertken
State Division of Bay Toll Crossings

Robert B. Hatch
State Department of Parks and Recreation

Lawrence Dahms
Bay Area Rapid Transit District

E. Jack Schoop
Bay Conservation & Development Commission

Col. Guy O. deYoung, Jr.
United States Army

Walter Stoll
Department of City Planning
City and County of San Francisco

Robert Levy
Department of Public Works
City and County of San Francisco

Richard J. Evans
Division of Traffic
Department of Public Works
City and County of San Francisco

Thomas W. Malloy
Department of Parks and Recreation
City and County of San Francisco

Frank J. Scheifler
San Francisco Municipal Railway

Jack Barron
Transit Task Force
City and County of San Francisco

Werner Von Gundell
Department of Planning
County of Marin

James Robertson
Department of Public Works
County of Marin

W. D. Vail
Department of Planning
County of Sonoma

Donald Head
Department of Public Works
County of Sonoma

Joseph Rodota
Department of Parks and Recreation
County of Sonoma

Vernon S. Cotter
Department of Planning
County of Napa

Albert P. Beltrami
County Administrator
County of Mendocino

David Grenbemer
Public Administrator
County of Del Norte

Citizens' Advisory Panel (CAP)

General Chairman
Mrs. Alfred Azevedo
Tiburon

Transportation
Mr. Gerald P. Cauthen
(Telegraph Hill Dwellers)
San Francisco

Mr. Thomas E. Burke*
(Golden Gate Commuters Club)
Sausalito

Regional Issues
Mr. P. K. Buskirk
(Planner)
Tiburon

Mr. Michael Fischer
(SPUR)
San Francisco

Social
Mr. Charles Turner
(Western Addition Community Organization)
San Francisco

Mr. Kenneth M. Angella
(Pacific Commuter Service)
Berkeley

Land Use Planning
Mr. Harvey Bragdon
Mill Valley

Mr. Robert P. Lilienthal
San Francisco

Political
Mrs. Jane King Fairchild
(Marin County Board of Realtors)
San Rafael

Mr. Neville Cantor*
(Golden Gate Commuters Club)
Larkspur

Economic
Mr. Richard Katz
Sausalito

Miss Ginger Costanzo*
(Marin Ecology Center)
San Rafael

Environmental/Ecological
Mr. Lester Cohen
(Sierra Club)
Sausalito

Mr. Pat Goggins
(Marin Ecology Center)
Mill Valley

Development
Mr. George Williams
San Francisco

Mr. Peter W. Otis
Larkspur

Open Space/Recreation
Mr. Wayne Wedell
(Sausalito Coalition for an Open Waterfront)
Sausalito

Mr. Michael Painter
(People for Open Space)
San Francisco

Financing the System
Mr. Robert Leo Moran
(Golden Gate Commuters Association)
San Francisco

Mr. Martin Bruton
(Lindskog Realty)
San Rafael

At Large Representatives

Sonoma County
Mr. Thomas Cox
(Santa Rosa Chamber of Commerce)
Santa Rosa

Napa County
Mr. John R. Hancock
(Napa County Development Council)
Napa

Technology
Professor T. Y. Lin
San Francisco

Citizen Involvement Process
Mrs. Alfred Azevedo
(Marin Council for Civic Affairs)
Tiburon

Commerce
Mr. William Howell
Tiburon

*Non-voting participant; organization already represented.

Board of Directors

November 24, 1970

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Marin County

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City and County of San Francisco

Michael Wornum
Marin County

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General Manager

Helen Jack
Secretary

Gordon E. Dahlgren
Auditor-Controller

Thomas M. Jenkins
Attorney

Robert E. Shields
District Engineer

Transportation Facilities Plan

Project Management

Robert E. Shields
Project Manager

Y. Tito Sasaki
Transportation Planner

Consultants

Engineering
Kaiser Engineers

Traffic Studies
Peat, Marwick, Mitchell & Co.

Environmental Planning
Okamoto/Liskamm, Inc.

The complete reports of the consultants will be available for study in the District offices, in many public libraries, and in the offices of city and county governments throughout the district. Members of the public are urged to acquaint themselves fully with the details of the studies which necessarily have only been highlighted in this summary.

Your questions and comments about the long-range Transportation Facilities Plan should be addressed to:

Robert E. Shields, *Project Manager*
Golden Gate Bridge, Highway and
Transportation District
P.O. Box 9000, Presidio Station
San Francisco 94129

For telephone information,
call Area 415, 346-5858, Ext. 37

GOLDEN GATE BRIDGE, HIGHWAY AND TRANSPORTATION DISTRICT